[0019] **FIG. 2** is a schematic diagram depicting an exemplary screen of the display device corresponding to the directional input system of **FIG. 1**;

[0020] **FIG. 3** is a schematic diagram depicting a preferred layout of an on-screen keyboard according to the invention;

[0021] **FIG. 4A** is a schematic view of a set of compass points according to one embodiment of the invention;

[0022] **FIG. 4B** is a schematic view of a set of compass points around the word selection list according to another embodiment of the invention;

[0023] **FIG. 5** is a schematic view of an on-screen feedback of the directional input system according to the invention;

[0024] **FIG. 6** is a flow diagram illustrating a process for precision input mode of the directional input system according to the invention; and

[0025] **FIG. 7** is a flow diagram illustrating a process for operating the directional input system according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0026] The invention provides a directional input system associated with a text entry application, such as email or instant messaging. The system includes an optional onscreen representation of a circular keyboard, a list of potential linguistic object matches, and a message area where the selected words are entered. The circular keyboard is manipulated via a hardware joystick or game-pad having an analog joystick or omni-directional rocker switch built therein. The user points the joystick in the general direction of the desired letter, and then continues pointing roughly to each letter in the desired word. Once all letters have been roughly selected, buttons or equivalent means are used to select a specific word from the list of potential matches and send the selected word to the message area.

[0027] System Construction and Basic Operation

[0028] **FIG. 1** is a block schematic diagram illustrating a directional input system **100** incorporated in a home video game console machine according to the preferred embodiment of this invention. The input system **100** includes an analog joystick **110** having one or more buttons, a vocabulary module **150** which stores a collection of linguistic objects, a display device **120** having a text display area, and a processor **140**. The processor **140**, which connects the other components together, further includes an object search engine **142**, a distance calculation module **144** for calculating distance value, a word (linguistic object) module **146** for evaluating and ordering words, and a selection component **148**. The system **100** may further include an optional on-screen representation of a keyboard **130** showing on the display device **120**.

[0029] The joystick **110** serves as a directional selection input device, which provides a possibility of directional input with a sufficient precision, preferably 100 or more precise. It is preferable that the default position of the cursor, if it is shown, is at the center of the circle of letters. It is possible to use a joystick device to navigate in two dimensions an on-screen "QWERTY" or "ABC" keyboard, either in the standard rectangular form or in a circular layout. It is also possible to navigate through multiple concentric rings of characters. It is the goal of this invention, however, to depend only on the joystick in its center/resting position and its non-centered (or perimeter) positions, i.e. using the radial direction rather than the specific degree of tilt.

[0030] As soon as a direction has been established by some degree of tilt from the center, the input may be registered and recorded. It may still be beneficial to the user, however, to allow the direction to be altered slightly before recording it. Therefore, the last effective direction is only recorded after the joystick is returned to its resting position in the preferred embodiment of the invention.

[0031] Although analog joystick is described as the preferred directional selection device, any input device that provides the possibility of directional input with a sufficient precision can be used. For examples: omni-directional rocker switch, thumbstick, e.g. IBM TrackPoint™, touchpad, touchscreen, touchscreen and stylus combination, trackball, eye tracking device, trapped-disk sliding switch, steering wheel, Apple iPod™ Navigation Wheel, or Sony's Jog-dial and data glove, e.g. old Nintendo Game Glove, can be used as alternative.

[0032] The joystick input device preferably has eight buttons. However, it may only have one button, or any other number of buttons. Note that the stick itself does not usually have that many buttons despite the fact that the joystick base or enclosing game controller may have. A 4-way directional hat switch or jog-dial may be used to support multiple functions, both for character input and for secondary navigation. In addition, a joystick may be pressed straight down (z-axis) to provide an additional button.

[0033] These buttons provide a mechanism for explicit commands to the system. One of the buttons may invoke a menu which contains additional commands. Another button may change the set of characters which may be selected via the directional input.

[0034] In an alternate embodiment, a second joystick or omni directional rocker switch is used to invoke some of the explicit commands of the system. For example, tilting the joystick up and down scrolls through the word choices and tilting it to the right extends the current word with a choice of suffixes.

[0035] The linguistic objects that are stored in the vocabulary module **150** include but not limit to: words, phrases, abbreviations, chat slang, emoticons, user IDs, URLs, non-English (such as Chinese or Japanese) characters. Although words are used in the preferred embodiments, any other linguistic objects are equally applicable. Similarly, although the term "letter" or "character" is used in the preferred embodiment, other sub-word components from Non-English languages, e.g. strokes, radicals/components, jamos, kana, plus punctuation symbols and digits, are equally applicable.

[0036] The list of predicted words is ordered in accordance with a linguistic model, which may include one or more of: frequency of occurrence of a word in formal or conversational written text; frequency of occurrence of a word when following a preceding word or words; proper or common grammar of the surrounding sentence; application context of current word entry; and recency of use or repeated use of the word by the user or within an application program.